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CLAIMS

1. Apparatus for laying elongate articles from a vessel at sea, the apparatus comprising tensioning means for controlling paying out of said articles along an axis of
5 said tensioning means, a structure tiltable between upright and horizontal states, wherein the apparatus is operable in a first mode wherein the tensioning means is carried by said structure with its axis at an elevated angle, aligned with a departure angle of the article being laid, and in a second mode wherein the tensioning means is arranged with its axis substantially horizontal, the apparatus in the second mode
10 comprising overboarding means for receiving flexible elongate product from the tensioning means along said axis and diverting it to a more vertical angle for departure from the vessel.
2. Apparatus as claimed in claim 1 wherein the tiltable structure in the first mode
15 carries a radius controller and a straightener for conditioning rigid pipe at a position upstream of the tensioning means.
3. Apparatus as claimed in claim 2 wherein the radius controller and/or the straightener are provided at least partially in the form of modules which can be
20 removed when the apparatus is operated in the second mode.
4. Apparatus as claimed in claim 3 wherein the overboarding means comprises a sheave.
- 25 5. Apparatus as claimed in claim 1, 2, 3 or 4 wherein the overboarding means is provided at least partially in the form of a module which can be removed when the apparatus is in the first mode.
- 30 6. Apparatus as claimed in any preceding claim wherein the tiltable structure is operable in the first mode to orient the tensioning means vertically and at a range of angles below vertical.

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7. Apparatus as claimed in any preceding claim wherein in said second mode the tensioning means is detached from and supported independently of the tiltable structure, the tiltable structure being returned to an upright orientation for supporting loads independently of the tensioning means.

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8. Apparatus as claimed in claim 7 wherein the tiltable structure can be operated in the second mode at a range of angles either side of vertical, to support in-line accessories as the product travels over said overboarding means.

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9. Apparatus as claimed in any preceding claim wherein the tensioning means in the second mode is located at a position displaced horizontally from a location from which it will be elevated by said tiltable structure in the first mode.

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10. Apparatus as claimed in any preceding claim wherein the tiltable structure comprises a pair of legs pivoted to the deck of the vessel at their lower ends and joined by a crossbeam at their upper ends, the tensioning means in the first mode being carried between the legs below the crossbeam, with a straightener and radius controller mounted above the crossbeam and being detachable when adapting the apparatus into the second mode.

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11. Apparatus as claimed in claim 9 wherein the tiltable structure is movable to provide said horizontal displacement of the tensioning means.

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12. Apparatus as claimed in claim 11 wherein the tiltable structure is connected to the vessel by one or more arms pivotally connected at one end to the tiltable structure and at another end to the vessel.

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13. Apparatus as claimed in any preceding claim wherein the hydraulic control system of the tensioning means is a dual hydraulic system.

14. Apparatus as claimed in any preceding claim wherein the tensioning means include pads for gripping the elongate article, each pad comprising a base piece bolted

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to the tensioning means and an insert fitted with a quick release mechanism so that it can be changed for a different insert.

15. A method of configuring apparatus for laying elongate articles from a vessel at sea, the apparatus comprising tensioning means for controlling paying out of said articles along an axis of said tensioning means, a structure tiltable between upright and horizontal states, wherein the apparatus is configurable in a first mode wherein the tensioning means is carried by said structure with its axis at an elevated angle aligned with a departure angle of the article being laid, and in a second mode wherein the tensioning means is arranged with its axis substantially horizontal, the apparatus in the second mode comprising overboarding means for receiving flexible elongate product from the tensioning means along said axis and diverting it to a more vertical angle for departure from the vessel, the method including detaching certain operating equipment from the structure, moving the structure between the upright position and the horizontal position and locating certain operating equipment for operation with the structure in the particular mode of operation.

16. A method as claimed in claim 15 wherein the operating equipment is provided as modules which can be removed and relocated with respect to the structure.

17. A method as claimed in claim 15 or claim 16 wherein in the first mode a radius controller and/or straightener are provided at least partially in the form of modules which can be removed when the structure is in the horizontal state.

18. A method as claimed in any of claims 15 to 17 wherein the tensioning means in the second mode is located at a position displaced horizontally from a location from which it will be elevated by said tiltable structure in the first mode.

19. A method as claimed in any of claims 15 to 18 wherein said operating equipment includes the overboarding means itself, which is detached from said tiltable structure in said first mode.

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20. A method as claimed in any of claims 15 to 19 wherein said operating equipment includes the tensioning means itself, which is detached from and supported independently of said tiltable structure in said second mode.

5 21. A method of laying rigid pipeline from a vessel, the method comprising paying out the pipeline using an apparatus as claimed in any of claims 1 to 14, operated in its first mode, the tensioning means gripping and paying out the rigid pipeline while supported on said tiltable structure at an angle aligned with the angle of departure of the pipeline from the vessel.

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22. A method of laying flexible pipeline from a vessel, the method comprising paying out the pipeline using an apparatus as claimed in any of claims 1 to 14, operated in its second mode, the tensioning means gripping and paying out the flexible pipeline along said substantially horizontal axis, the pipeline being diverted by said
15 overboarding means from said horizontal axis to the angle of departure of the pipeline from the vessel.

CLAIMS

1. Apparatus for laying elongate articles from a vessel at sea, the apparatus comprising tensioning means for controlling paying out of said articles along an axis of
5 said tensioning means, a structure tiltable between upright and horizontal states, wherein the apparatus is operable in a first mode wherein the tensioning means is carried by said structure with its axis at an elevated angle, aligned with a departure angle of the article being laid, and in a second mode wherein the tensioning means is arranged with its axis substantially horizontal, the apparatus in the second mode
10 comprising overboarding means for receiving flexible elongate product from the tensioning means along said axis and diverting it to a more vertical angle for departure from the vessel.
2. ~~Apparatus for laying elongate articles from a vessel at sea as claimed in claim 1~~
15 wherein the tiltable structure in the first mode carries a radius controller and a straightener for conditioning rigid pipe at a position upstream of the tensioning means.
3. ~~Apparatus for laying elongate articles from a vessel at sea as claimed in claim 2~~
20 wherein the radius controller and/or the straightener are provided at least partially in the form of modules which can be removed when the apparatus is operated in the second mode~~structure is in the horizontal state.~~
- ~~4. Apparatus for laying elongate articles from a vessel at sea as claimed in any~~
25 ~~preceding claim which further comprises overboarding means for receiving flexible elongate product from the tensioning means in the second mode.~~
- ~~5. Apparatus for laying elongate articles from a vessel at sea as claimed in claim~~
~~24 wherein the overboarding means comprises a sheave.~~
- 30 ~~56. Apparatus for laying elongate articles from a vessel at sea as claimed in claim 1,~~
~~2, 3 or 4 or claim 5 wherein the overboarding means is provided at least partially in the form of a module which can be removed when the apparatus is in the first mode.~~

~~67.~~ Apparatus for laying elongate articles from a vessel at sea as claimed in any of the preceding claims wherein the tiltable structure is operable in the first mode to orient the tensioning means vertically and at a range of angles below vertical.

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~~78.~~ Apparatus for laying elongate articles from a vessel at sea as claimed in any preceding claim wherein in said second mode the tensioning means is detached from and supported independently of the tiltable structure ~~in the second mode, and the tiltable structure being can be~~ returned to an upright orientation for supporting loads independently of the tensioning means.

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~~89.~~ Apparatus for laying elongate articles from a vessel at sea as claimed in claim ~~87~~ wherein the tiltable structure can be operated in the second mode at a range of angles either side of vertical, to support in-line accessories as the product travels over said overboarding means.

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~~910.~~ Apparatus for laying elongate articles from a vessel at sea as claimed in any preceding claim wherein the tensioning means in the second mode is located at a position displaced horizontally from a location from which it will be elevated by said tiltable structure in the first mode.

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~~1011.~~ Apparatus for laying elongate articles from a vessel at sea as claimed in any preceding claim wherein the tiltable structure comprises a pair of legs pivoted to the deck of the vessel at their lower ends and joined by a crossbeam at their upper ends. the tensioning means in the first mode being carried between the legs below the crossbeam, with a straightener and radius controller mounted above the crossbeam and being detachable when adapting the apparatus into the second mode.

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~~112.~~ Apparatus for laying elongate articles from a vessel at sea as claimed in claim ~~910~~ wherein the tiltable structure is movable to provide said horizontal displacement of the tensioning means.

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123. ~~Apparatus for laying elongate articles from a vessel at sea~~ as claimed in claim 112 wherein the tiltable structure is connected to the vessel by one or more arms pivotally connected at one end to the tiltable structure and at another end to the vessel.
- 5 134. ~~Apparatus for laying elongate articles from a vessel at sea~~ as claimed in any preceding claim wherein the hydraulic control system of the tensioning means is a dual hydraulic system.
- 10 145. ~~Apparatus for laying elongate articles from a vessel at sea~~ as claimed in any preceding claim wherein the tensioning means include pads for gripping the elongate article, each pad comprising a base piece bolted to the tensioning means and an insert fitted with a quick release mechanism so that it can be changed for a different insert.
- 15 156. A method of configuring apparatus for laying elongate articles from a vessel at sea, the apparatus comprising tensioning means for controlling paying out of said articles along an axis of said tensioning means, a structure tiltable between upright and horizontal states, wherein the apparatus is configurable in a first mode wherein the tensioning means is carried by said structure with its axis at an elevated angle aligned with a departure angle of the article being laid, and in a second mode wherein the tensioning means is arranged with its axis substantially horizontal, the apparatus in the second mode comprising overboarding means for receiving flexible elongate product from the tensioning means along said axis and diverting it to a more vertical angle for departure from the vessel. ~~which method includes~~ the method including detaching certain operating equipment from the structure, moving the structure between the upright position and the horizontal position and locating certain operating equipment for operation with the structure in the particular mode of operation.
- 20 25 30 167. A method as claimed in claim 156 wherein the operating equipment is provided as modules which can be removed and relocated with respect to the structure.

178. A method as claimed in claim 4615 or claim 4716 wherein in the first mode a radius controller and/or straightener are provided at least partially in the form of modules which can be removed when the structure is in the horizontal state.

5 189. A method as claimed in any of claims 4615 to 4817 wherein the tensioning means in the second mode is located at a position displaced horizontally from a location from which it will be elevated by said tiltable structure in the first mode.

10 1920. A method as claimed in any of claims 4615 to 4918 wherein said operating equipment includes the overboarding means itself, which is detached from said tiltable structure in said first mode.

15 204. A method as claimed in any of claims 4615 to 2019 wherein said operating equipment includes the tensioning means itself, which is detached from and supported independently of said tiltable structure in said second mode.

20 212. A method of laying rigid pipeline from a vessel, the method comprising paying out the pipeline using an apparatus as claimed in any of claims 1 to 1514, operated in its first mode, the tensioning means gripping and paying out the rigid pipeline while supported on said tiltable structure at an angle aligned with the angle of departure of the pipeline from the vessel.

25 222. A method of laying flexible pipeline from a vessel, the method comprising paying out the pipeline using an apparatus as claimed in any of claims 1 to 1514, operated in its second mode, the tensioning means gripping and paying out the flexible pipeline along said substantially horizontal axis, the pipeline being diverted by said overboarding means from said horizontal axis to the angle of departure of the pipeline from the vessel.

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